



LIQUID ANTI-STRIP ADDITIVES MSP-00-03

1.0 Description. The following describes the method of use for liquid anti-strip additives, when used in bituminous mixtures.

2.0 Modify Sec 403.2 as follows:

403.2 Material. All material shall conform to Division 1000, Materials Details, and specifically as follows:

<i>Item</i>	<i>Section</i>
Coarse Aggregate	1002.1
Fine Aggregate	1002.2
Mineral Filler	1002.3
Hydrated Lime	1002.4
Asphalt Binder, Performance Graded (PG)	1015
Fiber Additive <u>and Liquid Anti-Strip</u>	1071

The grade of asphalt binder will be specified in the contract.

3.0 Add Sec 404.8 as follows:

404.8 Liquid Anti-Strip Additive Systems. Type I liquid anti-strip additives shall be blended into the asphalt binder. Type II additives shall be sprayed on the combined cold feed aggregate. Both shall be done using specialized equipment, in a consistent and uniform manner, as specified by the manufacturer of the mixing plant equipment, to the satisfaction of the engineer and as specified herein.

404.8.1 The method of adding an additive into the mix shall be accurate to within ± 10 percent of the amount to be added. It shall be capable of being easily and accurately calibrated.

404.8.2 The feed system shall be equipped with a flow meter, which signals if the additive is or is not being added. It shall be interlocked with the plant controls so that mix production will cease if the additive flow is interrupted or not within the allowable limits.

404.8.3 The rate of application shall be interlocked with the plant to coincide with plant production rates. Prior to the start of production, the engineer shall approve the additive blending system.

404.8.4 For Type I liquid anti-strip additive used in drum and continuous mix plants, the blending system shall add the material into a static in-line mixer between the asphalt binder storage tank and the asphalt binder flow meter. For batch plants, the blending system shall add the materials into a static in-liner mixer between the asphalt binder storage tank and the mixing plant injection point. Controls shall be in place so

that blended material is not allowed to recirculate back to the asphalt binder storage tank.

404.8.5 For Type II liquid anti-strip blending systems, the blending system shall uniformly apply the material to the cold feed prior to the drum for continuous, batch and drum plants.

4.0 Modify Sec 1071 title to "Bituminous Mixture Release Agents and Additives" and add following:

1071.4 Liquid Anti-Strip Additives. Liquid anti-strip additives shall not be detrimental to the bituminous mixture.

1071.4.1 Amine type liquid anti-strip additives, which are physically mixed with the asphalt binder, will be classified as Type I. Latex type liquid anti-strip additives, which are applied to the aggregate, will be classified as Type II. The following physical properties shall be determined for each type.

1071.4.1.1 Type I.

Test	Test Method
Specific Gravity @ 77F (25 C)	AASHTO T 228
Brookfield Viscosity (77F, 25 C) using an RVT viscometer. The report shall include the corresponding test temperature, speed, spindle and model of instrument.	ASTM D2196
Pensky-Martens Closed Cup Flash Point or Cleveland Open Cup Flash Point	ASTM D93
Infrared Spectrum (neat material)	AASHTO T 48 Appropriate Method

1071.4.1.2 Type II.

Test	Test Method
Weight Per Gallon @ 77F (25 C)	ASTM D1475
Brookfield Viscosity (77F, 25 C) using an RVT viscometer. The report shall include the corresponding test temperature, speed, spindle and model of instrument.	ASTM D2196
pH	Appropriate Method
Percent Solids	ASTM D1644 Method A
Infrared Spectrum (latex portion)	Appropriate Method

1071.4.2 The additive shall be stable and not separate under all manufacturer listed storage and use temperatures. When Type I or Type II additives are blended with the proposed bituminous material to be used at the anticipated application rate, the blended material shall still meet all bituminous material specifications. Furthermore, the blended material shall be heat stable. Heat stability will be verified comparing AASHTO T 283 specimens made by preparing three conditioned specimens using aged, blended

material that has been held at 325 F (165 C) for 96 hours and three conditioned specimens using fresh blended materials. The average tensile strength of conditioned specimens using aged material shall be compared with conditioned specimens made with fresh blended material. If the average conditioned strength of the mixture with aged material is less than 90 percent of the mixture with fresh blended material, the anti-strip additive will not be allowed for use. This requirement shall also be met if tested on any specific mix design using the approved anti-strip.

1071.4.3 When incorporated into the proposed bituminous mixture, the anti-strip additive shall not significantly lower the unconditioned strength of AASHTO T-283 specimens. This shall be verified on each bituminous mixture by the mix designer, by preparing an additional three unconditioned specimens without the liquid anti-strip additive. The average tensile strengths of unconditioned specimens shall be compared with and without the liquid anti-strip additive. If the average unconditioned strength of the mixture with additive is less than 90 percent of the mixture without additive, the anti-strip additive will not be allowed for use in that bituminous mixture.

1071.4.4 Prequalification and Brand Name Approval. Prior to approval and use of a liquid anti-strip additive, the manufacturer shall submit to the State Materials Engineer, a certified test report showing test results for all the specified requirements, including the manufacturer's name, brand name of material, lot and date tested. In addition, the manufacturer shall furnish the recommended application rate, information for any dilution requirements, including the minimum dilution rate, storage requirements and life, mixing requirements, and a copy of product literature and Material Safety Data Sheet (MSDS). When requested, the manufacturer shall also submit a one gallon sample. Upon approval of the material, the brand name, manufacturer, recommended application rate and any special application requirements will be placed on a list of prequalified liquid anti-strip additives.

1071.4.5 Approval and Acceptance. The engineer shall be furnished a copy of the bill of lading for each shipment of material along with the required certification. Approval of liquid anti-strip additives will be based on a manufacturer's certification that the material being furnished is the same as that furnished for prequalification and brand name approval, and that the material complies in all respects with the requirements of these specifications. In addition, the engineer reserves the right to sample and test any material at destination as deemed necessary.